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# Immunization Status of Children in Urban Slums of Rawalpindi and Barriers to Immunization

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## ABSTRACT

***Objective***: To determine immunization status of children residing in urban slums of Rawalpindi and identify the barriers to immunization.

***Study Design***: Cross sectional study.

***Place and Duration of Study***: Slums of Takht Pari, Rawalpindi Pakistan, from Jan to Mar 2020.

***Methodology***: Children, aged 12-23 months, residing at Takht Pari were enrolled. Two sessions of a free medical camp were arranged at Takht Pari by Department of Community Medicine, Foundation University, Islamabad. Data was collected from parents visiting the medical camp with the mother labelled as the primary respondent. Immunization cards and mother's recall were used to assess the immunization status of children.

***Results***: Two hundred ninety-one (72.9%) children were completely immunized, partially immunized were 106(26.6%) while 2(0.5%) were unimmunized. Three hundred eighty-eight (97.2%) children were vaccinated through government centers while those who received vaccination through private clinics were 9(2.3%). Factors associated with incomplete immunization were education of parents ($p$<0.001), number of children ($p$<0.001), gender of child ($p$=0.001), access to TV or Radio ($p$<0.001), and site of immunization (government/private) ($p$<0.001).

***Conclusion***: Immunization status of 73% shows that unremitting efforts are essential for attaining universal coverage of immunization with extra attention to underprivileged areas. Planning and placement of public facilities for preventive services needs to be an urgent priority improving service utilization and enhancing coverage as people tend to follow ease of accessibility for using immunization services.

**Keywords**: Communicable Diseases, immunization coverage, slums.

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## INTRODUCTION

Immunization coverage trends differ significantly throughout the globe with higher income countries having a better immunization coverage than lower income countries. Countries with sub-optimal immunization coverage report poorer health outcomes attributable to vaccine preventable diseases.[1,2] According to WHO, infectious diseases are a major cause of morbidity and mortality among children less than 5 years age. Although global under-5 mortality rate declined in 2019, however, despite of this progress, approximately 5.2 million children under 5 years age died in 2016.[3] In the United States (US), many vaccine-preventable diseases are at record low level with under-5 mortality rate of 6.8/1000 live births. According to World Bank, Pakistan's under-5 mortality rate is 69 /1000 live births, most of which is attributable to communicable diseases.[4]

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Immunization is the most important and cost-effective public health strategy to decrease the burden of communicable diseases in children and improve child survival.[5,6] Childhood immunizations also decrease the cost of managing these diseases, thereby playing a key role in alleviation of poverty and moving towards attainment of SDGs. Residents of underprivileged areas are more prone to communicable diseases due to their low socioeconomic status, residence in highly populated areas with insufficient cleanliness and sub-optimal health-seeking behavior.[7]

Although Pakistan has made a remarkable improvement coverage of routine immunization with expansion in coverage from 20% in 1980 to more than 80% in 1996. However, over the past few years there has been a declining trend in vaccination coverage. 2012-2013 surveys revealed the coverage to be at 54%.[8] Pakistan and Afghanistan are the two remaining countries in the world where Polio is still an endemic infection.[9] Thus, focused efforts are required for elimination of vaccine preventable diseases (VPDs)

from our country, which continue to be a major cause of under-5 morbidity and mortality in Pakistan.[10] This study will help the policy makers in evidence-based planning and citing of public facilities aimed to deliver preventive services, which is the need of the hour, in order to enhance community acceptance, community participation and community utilization of health services.

## METHODOLOGY

The cross-sectional study was conducted at Takht Pari, a slum area in suburbs of Rawalpindi, Pakistan, from January to March 2020. Approval was gained from Ethics Review Committee of Foundation University Medical College (Ref No FF/FUMC/215-2 Phy/20). Sample size was calculated using OpenEpi, version 3.00. Assuming routine immunization coverage of 50%.[11]

**Inclusion criteria**: Children of either gender with age between 12-23 months, visiting free medical camp were included.

**Exclusion criteria**: Children who spent first 12 months of their life outside Takht Pari and those who were not accompanied by parents at the time of visit were excluded.

Participants were enrolled through nonprobability consecutive sampling after taking informed written consent. Data was collected from parents where mother was considered as the primary respondent. If mother was not available, then father was labelled as primary respondent.

Two sessions of free medical camps were arranged by Department of Community Medicine, Foundation University, Islamabad, at Takht Pari, Rawalpindi. Data was collected through researcher administered structured questionnaire.[12] Sociodemographic data regarding age, education and occupation of parents, household income, nuclear /joint family, number of children and distance of EPI Centre (in kilometers) was noted. Immunization cards and mother's recall were used to assess the immunization status of children. Child was considered as fully Immunized if he/she had received all doses of vaccines according to the EPI schedule[13] or considered partially immunized if received some doses but not complete and unimmunized if no doses were given.

Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 23:00. Numerical variables were described as mean and SD while categorical variables were described as frequency and percentages. Pearson's Chi-square test was applied and *p*-value of < 0.05 was considered statistically significant.

## RESULTS

Out of 399 eligible children aged between 12-23 months, 216(54.1%) were males and 183(45.9%) were females. Age range of mothers was from 20-39 years with mean age of 25.5+4.4 years while age range of fathers was from 22-41 years with mean age of 31.6+3.9 years. 226(56.6%) were illiterate while 158(39.6%) had education below matric. Three hundred ninety-four (98.7%) mothers were housewives and 370(92.7%) were residing in joint families (Table-I).

**Table-I: Socio-Demographic Data of Respondents (Parents) (n=399)**

| Variables | Father n (%) | Mother n (%) |
|---|---|---|
| **Age (Years)** | | |
| <20 | - | 51(12.8) |
| 21-25 | 28(7) | 156(39.1) |
| 26-30 | 130(32.6) | 126(31.6) |
| 31-35 | 178(44.6) | 63(15.8) |
| 36-39 | 59(14.8) | 3(0.8) |
| >40 | 4(1) | - |
| **Education** | | |
| Illiterate | 126(31.6) | 226(56.6) |
| Primary | 130(32.6) | 121(30.3) |
| Middle | 91(22.8) | 37(9.3) |
| Matric | 41(10.3) | 13(3.3) |
| Graduate | 11(2.8) | 2(0.5) |
| **Occupation** | | |
| Unemployed/Housewife | 26(6.5) | 394(98.7) |
| Daily Waged | 270(67.7) | - |
| Employed | 103(25.8) | 5(1.3) |

Two hundred Eight (52.1%) respondents had immunization cards of their children while data from rest 191(47.9%) respondents was obtained using their recall. Children who were vaccinated through Government centers were 388(97.2%) and those who received vaccination through Private clinics were 9(2.3%) (Table-II).

Most common causes identified for incomplete immunization are illustrated in Figure.

Parental education ($p$<0.001), gender of the child ($p$=0.001), number of children ($p$<0.001), access of mother to TV / Radio ($p$<0.001) and site of immunization (Government/ private) ($p$<0.001) had a significant association with child's immunization status. However, age of the parents ($p$=0.40, $p$=0.65), parental occupation ($p$=0.39, p=0.75) and residence in joint/ nuclear family ($p$=0.24) did not show any significant association with immunization status of children (Table-III).

**Table-II: Immunization Details of Children Aged 12-23 Months (n=399)**

| Variables | n (%) |
|---|---|
| **Gender of child** | |
| Male | 216(54.1) |
| Female | 183(45.9) |
| **Immunization card** | |
| Available | 208(52.1) |
| Not available | 191(47.9) |
| **Site of Immunization** | |
| Government | 388(97.2) |
| Private | 9(2.3) |
| Not given | 2(0.5) |
| **Immunization status** | |
| Fully Immunized | 291(72.9) |
| Partially Immunized | 106(26.6) |
| Unimmunized | 2(0.5) |

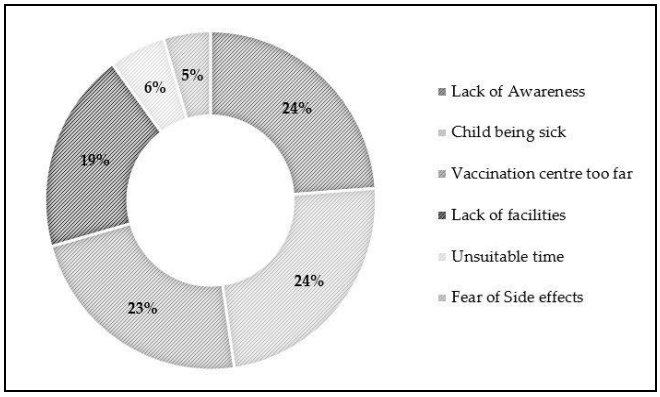


**Figure: Reasons for Partial / Non-Immunization Among Children Aged 12-23 Months (n=399)**

## DISCUSSION

The principal objective of any Health System is to improve the health status of population as health is a basic human right, declared by WHO, and every country is bound to provide equitable access to health services to all residents, however, health system in Pakistan is still in a struggling phase to achieve Universal Health Coverage.[14] Children comprise a major proportion of population in developing countries like Pakistan and poor child health indicators reflect the overall health status of the country.

Our study revealed that the proportion of fully immunized children residing in urban slums of Rawalpindi is 72.9%. Better results were observed for children with mother's having education above matric, mother's having access to any source of mass communication and for male gender. No significant association was observed with age of parents, educational status of father, occupation of parents and whether they were residing in joint / nuclear family.

Most common reason for noncompliance to vaccination was lack of awareness among parents followed by vaccination center being far away, lack of transportation facilities, sickness of child, fear of side effects and unsuitable time of vaccination. These results are in accordance with the statistics reported in Pakistan Demographic Health Survey (2017-18). According to PDHS 2017-18, overall, 66% children are fully immunized. However, there are regional differences in immunizations with 80% immunization coverage in Punjab. Moreover, children in rural areas have coverage of only 63% as compared to 71% for their urban counterparts, with similar findings reported by Bukhari *et al*, who listed poor public health infrastructure, lack of education/awareness and wrong beliefs regarding vaccinations as crucial factors for partial vaccination in children.[15] Another systematic review by Smith *et al*. highlighted that knowledge about vaccines, perceiving vaccines not to be harmful, positive attitude towards vaccinations and lesser practical difficulties for vaccinations were positively associated with vaccine uptake.[16] A qualitative study in China regarding perspectives of stakeholders on vaccine hesitancy showed that majority of the healthcare staff considered vaccines as safe, but most of the parents were not complying with recommended vaccine schedules, considered vaccines unsafe and did not want to put their children at risk.[17]

A study conducted in Bangladesh, reported that proximity to health facility, media exposure, age of mother, gender of child, mother's mobility, household income, frequency of visit by health workers and region of residence had significant association with acceptance of immunization.[18] Machingaidze *et al*. state that immunization coverage in low- and middle-income countries lag behind as compared to high income countries and they explored possible interventions including community-oriented interventions, provider-oriented interventions, interventions in Health system and multifaceted interventions for improving immunization coverage.[19]

Public Health policy makers should pay special attention to health indicators and immunization status of children residing in slum areas. Moreover, public health infrastructure in slum areas need to be upgraded, competently run and availability of vaccines must be ensured to warrant maximum uptake and utilization of services.

**Table-III: Association of Sociodemographic Variables with Immunization Status, (n=399)**

| Variables | Immunization Status | | | *p*-value |
|---|---|---|---|---|
| | Fully Immunized n (%) | Partially Immunized n (%) | Unimmunized n (%) | |
| **Gender of Child** | | | | |
| Male | 173(43.3) | 43(10.8) | - | 0.001 |
| Female | 118(29.6) | 63(15.8) | 2(0.5) | |
| **Number of Children (Parity)** | | | | |
| 1 | 48(12) | 7(1.7) | 1(0.2) | <0.001 |
| 2 | 43(10.8) | 34(8.5) | - | |
| 3 | 67(16.8) | 36(9) | - | |
| >4 | 134(33.6) | 28(7) | 1(0.3) | |
| **Age of Mother (years)** | | | | |
| <20 | 44(11) | 6(1.5) | 1(0.2) | 0.059 |
| 21-25 | 107(26.8) | 49(12.3) | - | |
| 26-30 | 86(21.6) | 39(9.8) | 1(0.2) | |
| 31-35 | 51(12.8) | 12(3) | - | |
| 36-39 | 3(0.8) | 0(0) | - | |
| **Education of Mother** | | | | |
| Illiterate | 141(35.3) | 83(20.8) | 2(0.5) | <0.001 |
| Primary | 104(26.1) | 17(4.3) | - | |
| Middle | 32(8) | 5(1.3) | - | |
| Matric | 12(3) | 1(0.2) | - | |
| Graduate | 2(0.5) | 0(0) | - | |
| **Occupation of Father** | | | | |
| Unemployed | 17(4.3) | 9(2.2) | - | 0.75 |
| Daily waged | 197(49.4) | 71(17.8) | 2(0.5) | |
| Employed | 77(19.3) | 26(6.5) | - | |
| **Access of mother to TV / Radio** | | | | |
| Yes | 283(71) | 68(17) | - | <0.001 |
| No | 8(2) | 38(9.5) | 2(0.5) | |
| **Residence** | | | | |
| Joint Family | 266(66.6) | 102(25.5) | 2(0.5) | 0.243 |
| Nuclear Family | 25(6.2) | 4(1) | - | |
| **Site of Immunization** | | | | |
| Government | 291(72.9) | 97(24.3) | - | <0.001 |
| Private | 0(0) | 9(2.3) | - | |
| Unimmunized | 0(0) | 0(0) | 2(0.5) | |

## CONCLUSION

This study concludes that although there is an overall noteworthy progress towards achieving full immunization coverage but still immunization indicators in underprivileged areas have not met the anticipated benchmarks and coverage is insufficient as compared to the regional and global immunization levels.

**Conflict of Interest:** None.

**Authors Contribution**

Following authors have made substantial contributions to the manuscript as under:

NK & NA: Data acquisition, data analysis, critical review, approval of the final version to be published.

QJ & MR: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

FARM & SI: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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